



**DEPARTMENT OF PUBLIC HEALTH
Division of Environmental Health**

Tammy Moss Chandler
Director of Public Health

Health Administration
260 E. 15th Street
Merced, CA 95341-6216
(209) 381-1200
(209) 381-1215 (FAX)

William Peeler III
*Director of Environmental
Health*

Environmental Health
260 E. 15th Street
Merced, CA 95341-6216
(209) 381-1100
(209) 384-1593 (FAX)
www.co.merced.ca.us/eh

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November 4, 2010

Charlene Herbst
California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive #200
Rancho Cordova, CA 95670
Attention: Confined Animal Regulatory Unit

**RE: General Order MRP Revision,
NPDES Permit and Groundwater Monitoring Revision Comments**

Ms. Herbst,

Merced County Division of Environmental Health (MCDEH) has reviewed the

- 1) Revised Monitoring and Reporting Program No. R5-2007-0035 General Order for Existing Milk Cow Dairies,
- 2) The General Waste Discharge Requirements and General National Pollution Discharge Elimination System (NPDES) Permit for Existing Milk Cow Dairy Concentrated Animal Feeding Operations within the Central Valley Region Draft, and,
- 3) Revised Monitoring and Reporting Program Order No. R5-2007-0035 Attachment A, Additional Groundwater Monitoring, Monitoring Well Installation and Sampling Plan and Monitoring Well Installation Completion Report for Milk Cow Dairies and provides the following comments.

The primary focal points of a Monitoring and Reporting Program should emphasize cost effective and appropriate sampling, analyses, and reporting to ensure compliance by establishing meaningful criteria for the issuance of a permit and or monitoring the short and long term environmental effects of dischargers.

Appropriate analyses is critical to reconcile waste handling, storage, and nutrient management practices to proposed plans on a field by field basis with emphasis on monitoring environmental impacts ultimately assessing the trend in concentrations of specific constituents in nutrients applied, crops harvested, soils, groundwater and surface waters at and near the dairy production facility and or land application area(s).

RB-5 may consider requiring the discharger to include any adopted changes/components of the draft General Order MRP/NPDES in written form into the

facility's Waste Management Plan (WMP) and or Nutrient Management Plan (NMP). Optionally, RB-5 may in the body of the Dairy General Order MRP and NPDES revision, incorporate by reference all specified changes as requirements of the dairy facility Operation and Maintenance Plan within the facility's WMP and Sampling and Analyses Plan within in the NMP.

Revised Monitoring and Reporting Program No. R5-2007-0035 General Order for Existing Milk Cow Dairies Comments (MRP)

Visual Inspections

Existing Language-

Monthly on the 1st day of each month:

Photograph each pond showing the current freeboard on that date. All photos shall be dated and maintained as part of the discharger's record.

Existing language in the MRP lacks specificity to confirm proper liquid level monitoring. Photographic inspection records should clearly include/show the actual depth marker in the pond and the freeboard with the top of the pond berm in the background of the photographs to confirm the depth marker is present and simultaneously indicate the pond liquid level is above, at, or below the minimum levels required.

Nutrient Monitoring

Process Wastewater, Manure, Plant Tissue, Soil, and Irrigation Water

Total phosphorus and total potassium analyses are proposed in the draft revisions to the General Order MRP. Total phosphorus and total potassium analyses are potentially problematic and not well suited to trend analyses for compliance purposes for solid and liquid media at dairy facilities where soil may be entrained and particularly where soil is the media of interest. MCDEH recently evaluated laboratory data from Hilmar, California land application area soil samples. Total phosphorus (P) and total potassium (K) analytical data from an ELAP certified laboratory ranged from 0.03 to 0.09 percent total phosphorus and 0.24 to 0.56 percent total potassium in Hilmar Loamy Sands (HgA, density at approximately 120 lbs/cu.ft.). The composite sample results were from soil columns from grade to 3 feet below grade surface in all cases. Calculated mass for total phosphorus ranged from an estimated 4,704 to 14,113 lbs/acre and total potassium from 37,636 to 87,817 lbs/acre in the top three feet. As a comparator MCDEH utilized the Kearney Foundation Special Report: Background Concentrations of Trace and Major Elements in California Soils, March 1996. Ranges in concentration, element mean values in the Kearney Report for California soils are reported as 0.0412 % for phosphorus (P=412 mg/kg) and 1.73 % for potassium (K= 17,300 mg/kg), no background data for HgA soils are included in the Kearney report. See MCDEH Soil Analyses and Component Content Estimates table attached for mass estimates for numerous elements. The individual elemental (Na, Ca, P, K, S...) contribution in soil is often significant without nutrient applications for or from crop production. Given the lack

of data for all anticipated soil types and their background elemental composition in the Region 5 area, and considering both solid and liquid forms of manure often contains significant quantities of entrained soil, it may be difficult at best to perform meaningful trend analyses utilizing “Total” P or “Total” K analyses results at dairy facilities.

MCDEH recommends soil test analysis be performed using analytical methods prescribed by the North American (formerly the Western States) Laboratory Proficiency Testing Program. Soil test Phosphorus should be determined using the Bray 1 method for soils with no free lime ($\text{pH} < 6.5$) and the Olsen method (NaHCO_3) method for soils with free lime ($\text{pH} > 6.5$). The MRP should require a “Soil Test Phosphorus Concentration” as a chemical evaluation of the capability of the soil, as represented by a soil sample, to supply plant available Phosphorus during the growing season to achieve a desired yield response. These preferred Phosphorus analyses methods essentially provide information in soils as soluble or plant available forms of phosphorus in contrast to total elemental phosphorus.

The MRP revision proposal fails to establish a Phosphorus Threshold (TH) or meaningful assessment of mobile forms of phosphorus. A recommended TH from the State of Idaho has been established previously (Paper No. 994079 An ASAE Meeting Presentation, Idaho Dairy Nutrient Management, by M. C. Mitchell, PE, J. C. Beddoes, EIT, Idaho State Department of Agriculture – Dairy Bureau Boise, ID, Written for Presentation at the 1999 ASAE Annual International Meeting Sponsored by ASAE, Toronto, Ontario, Canada, July 19-21, 1999). “The soil test phosphorus level above which there is no agronomic advantage for application of additional phosphorus is the Phosphorus Threshold (TH) and should be specific to crops grown” with an emphasis on crops in Region 5 of California. A TH must be used in the nutrient budgeting process to determine application rates, and to determine trends in soil P concentrations over time. Total phosphorus soil tests fail to assess the mass of phosphorus that may transport to groundwater or surface water through precipitation, irrigation, subsurface tile drainage, and groundwater accretion.

It appears that Total Fixed Solids (TFS) is proposed as a new analytical protocol for solid media including Manure and Plant Tissue as a surrogate for determining total salt content. If TFS analyses and reporting is adopted, MCDEH requests RB-5 promptly prepare and approve a computational method to convert TFS to total salt for reporting purposes.

MCDEH supports RB-5 in deleting density and volume options for determining manure and crop harvest quantities being applied, exported, and or removed. Visual determinations are often unreliable understanding heaped and or struck loading methods in the field can result in significantly higher or lower estimates of volume. Percent moisture and total weight is MCDEH’s preferred method for determining manure and crop harvest quantities being applied, exported, and or removed.

Annual Report

The MRP requires an *“Estimated amount of total manure (tons) and process wastewater (gallons or acre-inches) generated by the facility during the annual reporting period...”*.

Estimating the amount of process wastewater (gallons or acre-inches) generated by a dairy facility is challenging.

In the General Order, “Process wastewater” is defined as water directly or indirectly used in the operation of a milk cow dairy for any or all of the following: spillage or overflow from animal watering systems; washing, cleaning, or flushing pens, barns, manure pits, or other dairy facilities; washing or spray cooling of animals; or dust control...and includes any water or precipitation and precipitation runoff which comes into contact with any raw materials, products, or byproducts including manure, feed, milk, or bedding.

Currently annual reports submitted to and accepted by RB-5 estimate process wastewater generated by summing all reported wastewater applied to land application areas with all wastewater exported, and subtracting all wastewater imported (consistent with the method used in the 2008 Annual Report spreadsheet approved by the Central Valley Regional Water Quality Control Board). To ensure consistency within Region 5, MCDEH requests RB-5 promptly prepare, approve, and require measurement reporting methods and a companion computational method to quantify the above referenced components defined as “process wastewater” generated by the facility for reporting purposes and include these standards in the MRP revision.

In all cases reporting of “potassium” should be changed to “total potassium”.

MCDEH recommends the MRP be revised to include an annual reporting requirement to “Quantify the ratio of total nitrogen applied to land application areas and total nitrogen removed by crop harvest (nitrogen uptake)”.

Revised Monitoring and Reporting Program Order No. R5-2007-0035 Attachment A, Additional Groundwater Monitoring, Monitoring Well Installation and Sampling Plan and Monitoring Well Installation Completion Report for Milk Cow Dairies and provides the following Comments

Conceptual models of contaminant fate and transport are important to monitor well network design, monitor well locations, construction, and most critically the frequency of sampling and constituents requested.

Each time a soil boring is advanced into the subsurface these events should be utilized to evaluate the hydro-geologic setting in order to begin formulating a short and possibly long term yet cost effective groundwater monitoring plan. Soil types, contaminant

species, and contaminant mass are factors that assist hydro-geologic investigators to predict contaminant fate and transport outcomes including mass flux.

MCDEH recommends that RB-5 request or require limited depth discrete, and in some cases continuous core soil sample collection with contaminant analyses and reporting from boreholes to assist the investigators in formulating the monitoring frequency and constituents schedule. Examples for consideration: In the event subsurface soils in the monitoring areas are coarse grained and specific contaminants present are recognized as highly mobile monitoring, sample collection, analyses and reporting may be more frequent, where subsurface soils in the monitoring areas are tight grained and specific contaminants present are recognized as highly mobile monitoring, sample collection, analyses and reporting may be significantly less frequent.

General Reporting

MCDEH recommends that RB-5 require or strongly recommends all General Order, NPDES and Groundwater Monitoring reporting be submitted electronically in a digital format acceptable to the Executive Officer.

MCDEH thanks the Central Valley Regional Water Quality Control Board for this opportunity to comment. Should you have question regarding this correspondence please contact me at (209) 381-1097.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ronald W. Rowe", with a long horizontal flourish extending to the right.

Ronald W. Rowe – REHS, MPA
Supervising Environmental Health Specialist

Enclosure - Soil Analyses and Component Content Estimates

Soil Analyses and Component Content Estimates (lbs/acre)

Facility Name and Address:

Hilmar California Dairy

HGA (Hilmar Loamy Sand)

Soil Type:

Soil Density (lbs/ft³):

120

Soil Column Height (ft)

3

PPM to % Factor:

10,000

Soil Nutrient Content:

ELAP Lab #2714

Sample Date:

3/29/2010

Sample Type:

Composite

1 Acre:

43,560 ft²

Sample Descriptions

Site 1	Nitrate %	Calcium %	Sulfur %	Total Nitrogen %	Total Phosphorus %	Total Potassium %
	0.00076	0.22	0.08	0.069	0.03	0.24
Site 1	Nitrate lbs/acre	Calcium lbs/acre	Sulfur lbs/acre	Total Nitrogen lbs/acre	Total Phosphorus lbs/acre	Total Potassium lbs/acre
	119	34,500	12,545	10,820	4,704	37,636
Site 2	Nitrate %	Calcium %	Sulfur %	Total Nitrogen %	Total Phosphorus %	Total Potassium %
	0.00028	0.62	0.09	0.044	0.06	0.39
Site 2	Nitrate lbs/acre	Calcium lbs/acre	Sulfur lbs/acre	Total Nitrogen lbs/acre	Total Phosphorus lbs/acre	Total Potassium lbs/acre
	44	97,226	14,113	6,900	9,409	61,158
Site 3	Nitrate %	Calcium %	Sulfur %	Total Nitrogen %	Total Phosphorus %	Total Potassium %
	0.00033	0.2	0.09	0.061	0.04	0.27
Site 3	Nitrate lbs/acre	Calcium lbs/acre	Sulfur lbs/acre	Total Nitrogen lbs/acre	Total Phosphorus lbs/acre	Total Potassium lbs/acre
	52	31,363	14,113	9,566	6,273	42,340
Site 7	Nitrate %	Calcium %	Sulfur %	Total Nitrogen %	Total Phosphorus %	Total Potassium %
	0.00012	0.68	0.09	0.037	0.06	0.39
Site 7	Nitrate lbs/acre	Calcium lbs/acre	Sulfur lbs/acre	Total Nitrogen lbs/acre	Total Phosphorus lbs/acre	Total Potassium lbs/acre
	19	106,635	14,113	5,802	9,409	61,158
Site 8	Nitrate %	Calcium %	Sulfur %	Total Nitrogen %	Total Phosphorus %	Total Potassium %
	0.00068	0.6	0.09	0.044	0.09	0.56
Site 8	Nitrate lbs/acre	Calcium lbs/acre	Sulfur lbs/acre	Total Nitrogen lbs/acre	Total Phosphorus lbs/acre	Total Potassium lbs/acre
	107	94,090	14,113	6,900	14,113	87,817
Site 9	Nitrate %	Calcium %	Sulfur %	Total Nitrogen %	Total Phosphorus %	Total Potassium %
	0.00015	1.16	0.09	0.047	0.09	0.42
Site 9	Nitrate lbs/acre	Calcium lbs/acre	Sulfur lbs/acre	Total Nitrogen lbs/acre	Total Phosphorus lbs/acre	Total Potassium lbs/acre
	24	181,907	14,113	7,370	14,113	65,863
Site 10	Nitrate %	Calcium %	Sulfur %	Total Nitrogen %	Total Phosphorus %	Total Potassium %
	0.00023	1.09	0.09	0.049	0.05	0.38
Site 10	Nitrate lbs/acre	Calcium lbs/acre	Sulfur lbs/acre	Total Nitrogen lbs/acre	Total Phosphorus lbs/acre	Total Potassium lbs/acre
	36	170,929	14,113	7,684	7,841	59,590
Site 11	Nitrate %	Calcium %	Sulfur %	Total Nitrogen %	Total Phosphorus %	Total Potassium %
	0.00018	0.33	0.08	0.033	0.03	0.27
Site 11	Nitrate lbs/acre	Calcium lbs/acre	Sulfur lbs/acre	Total Nitrogen lbs/acre	Total Phosphorus lbs/acre	Total Potassium lbs/acre
	28	51,749	12,545	5,175	4,704	42,340

Comparator - Kearney Foundation Special Report: Background Concentrations of Trace and Major Elements in California Soils MARCH 1996
 Ranges in Concentration, Element Mean Values for California Ca=14,466 mg/kg, P=412 mg/kg, K=1.73 %